Discontinuation of VOR Services

Meeting 11-02

Mr. Ken Ward, FAA/AJW-911, provided an update on the FAA's plans to decommission over 400 VOR NAVAIDs by 2020. Mr. Ward briefed on the analytical work associated with insuring that sufficient VOR services that remain to support would the NAS. Early estimates show that 50 to 60 VORs per year would need to be decommissioned to meet the 2020 deadline.

Mr. Ward stated that a Federal Register notice which announces the elimination of VORs from the NAS, was close to being approved, awaiting for the NextGen Management Board's sign off.

Criteria is being worked on the how the FAA will evaluate VORs that currently in use to determine which can safely be decommissioned and which will need to remain operational.

Mr. Ward did not have any guidance regarding timelines for the decommissioning or for the establishment of any working groups, both within the FAA and with the aviation community.

Mr. Paul Eure, FAA/AJE-31, stated that Enroute, to date, had not been included in any discussions, meetings, etc., on the subject and have had to inject themselves into such proceedings. Mr. Eure expressed his concern regarding the lack of involvement of both Enroute and Terminal organizations in the coordination process. Mr. Eure noted that ATC Facilities should be given time and resources to be able to be engaged in the VOR analysis process to insure service and safety to users of the NAS.

ACTION: Mr. Ken Ward, FAA/AJW-911, will notify the Chair of ACF-Charting Group should a briefing be warranted at the next ACF.

Meeting 12-01

Mr. Ken Ward, FAA/AJW-911, provided an update on the FAA's plans to decommission over 400 VORs by 2020. Mr. Ward briefed that a Federal Register notice of proposed policy and request for comments was published on December 15, 2011 (Available on line at https://federalregister.gov/a/2011-31451). The comment period ended on March 7, 2012. A subsequent Federal Register notice is due out within the month of May encompassing the comments submitted.

Work continues on the process by which the FAA will evaluate VORs currently in use to determine which can safely be decommissioned and which will need to remain operational.

Mr. Ward stated that the overall plan briefed at the last ACF remained unchanged, with the projected number of VORs decommissioned remaining at or about 450. The number of DMEs in the NAS will not diminish, but is expected to drastically expand. The total number of required DMEs anticipated is as yet undetermined.

A lengthy discussion ensued, during which Mr. Paul Eure, FAA/AJE-31, mentioned his concern that the current Standard Service Volume (SSV) for VORs of 40 NM, compared with the 77 NM proposed, may cause problems. It was also discussed how the decommissioning of a large number of VORs would impact GA, how the FAA would insure the continuation of a sufficient number to insure safety, etc. The issue presents major challenges with regards to the redefinition of SSVs, routes, fixes, airspace, flight inspection, DME/DME/IRU reassessment, etc. and the associated costs incurred in making these changes.

Mr. Ted Thompson, Jeppesen, inquired as to budget implications for the FAA in defining fixes/airspace/procedure issues presented by the proposed migration to NEXTGEN. What are the costs associated with the charting changes that these actions will incur? Has the FAA planned and established cost projections for these changes?

Mr. Brad Rush, FAA/AJV-3B, responded that AeroNav Products is in the process of attempting to assess the cost impact, but that until detailed transition plans are received, this is not possible.

Mr. Thompson stated that the issue for commercial charting entities is the resources necessary to handle a large volume of changes to charts, procedures and database programming.

ACTION: Mr. Ken Ward, FAA/AJW-911, will notify the Chair of ACF-Charting Group should a briefing be warranted at the next ACF.

Meeting 12-02

Ken Ward, Contractor, FAA/AJM-324, provided a general overview of the activities within the FAA toward establishing a plan for the discontinuation of VOR services as part of the overall migration to NEXTGEN IFR Infrastructure. Ken had prepared a PowerPoint which was not able to be shown during the briefing, but is included here. He reported that the program charter is still a work in progress. On August 21, 2012, the FAA released an item in the Federal Register – Next Generation Air Transportation

System Transition to Performance Navigation, Federal Register Document No. 2012-20464. The Federal Register posting is the FAA's response to the public comments received per Federal Register Notice 76 FR 77939 posted on December 15, 2011.

Various industry members within the audience expressed concern over the perceived lack of coordination both within the FAA and with industry regarding the actual implementation of the plan to decommission VORs. Ken emphasized that a plan had not been fully developed, but was a work in progress. The general consensus from the discussion was that industry needs to be involved and have input **before** an FAA plan reaches maturity.

Deborah Miller-Adams, FAA/AJM-324, took several questions from various industry representatives and emphasized that the FAA is working to prepare itself for industry involvement in the migration to NEXTGEN. Deborah assured all the industry representatives that the FAA fully intends to have the industry involved and engaged in the migration process.

ACTION: Deborah Miller-Adams, FAA/AJM-324, (or a designated representative) will provide a briefing at the next ACF.

Meeting 13-01

JoAnn Ford, Acting Manager for AJW-41, presented an updated briefing and overview of the Very High Frequency Omnidirectional Range (VOR) Minimum Operation Network (MON) Implementation Program.

JoAnn introduced the project's Acquisition Management Systems (AMS) Project Manager, Ernesto Etienne, AJM-324.

JoAnn reviewed the overall plan of the systematic decommissioning of approximately half of the VORs within the NAS. JoAnn emphasized that there would still be VOR coverage at or above 5000 feet AGL, the remaining VORs having a service volume (SV) of 77nm. Work is being done now to assess and insure that the SV target is being met. The objective is to transition from the current VOR-based NAS to a RNAV-based NAS by 1 January 2020, at which time the VOR MON will have been fully tested and vetted.

JoAnn stated that the list of candidate VORs for shutdown is being vetted internally within the FAA. She emphasized that this process is ongoing and the list will continue to change as the FAA works through the transition process.

Greg Pray, AJV-211, expressed concern on the vetting process, stating that there are many public/private parties who will want to voice their concerns. He inquired to whom those parties should get in touch with about their concerns. JoAnn stated that Deborah Lawrence, AJM-321, is the best point of contact for such concerns.

Ray Lewis, USN, inquired about the process for VORs that are maintained by the FAA but are not part of the NAS, such as those in the Bermuda/Caribbean area.

Paul Eure, AJE-31, responded that the VORs in the Bermuda/Caribbean area are governed by various treaties and involve the U.S. State Department. Those VORs are not included in the current discussion.

John Collins, GA Pilot, asked whether there are plans to shutdown VORs on which Class B airspace areas are predicated and if so, how that would be handled.

Paul responded that various airspace classification definitions are a topic of discussion and are included in the ongoing evaluation of which VORs are critical.

Lucy Kruse, AJV-3C, asked if there was a separate subordinate program to look at VORs reaching their end-of-life service. She expressed her concern that all factors associated with VOR NAVAID facility shutdown are being taken into account. She inquired whether the ongoing discussions included the possibility of boosting the remaining VORs with Doppler kits or whether a cost assessment has been done on demolition of the VORs identified for decommissioning.

Paul responded, stating that there are teams working these issues. Paul emphasized that given the time line for the transition of the NAS to a PBN environment, there are a lot of issues that have to be taken into account and coordinated, while maintaining current NAS air traffic flow capabilities. The details of the plan are still solidifying and in the coming months and years, these decisions will be made. Paul added that currently, the sequestration cuts are having an impact on the availability of resources available within the FAA to address the challenges raised by this transition. Paul reassured the audience that there will be opportunities for organizations both within and outside of the FAA to comment and contribute to the plan that is evolving.

JoAnn commented that LPV is being put in place of VOR approaches where VORs are discontinued. Additional costs are being looked at and evaluated.

Bill Hammett, Contract Support, AFS-420, inquired as to whether there had been any thought about lowering the floor of controlled airspace to 1,200 feet AGL in the Western U.S. and the upper peninsula of Michigan? This action would greatly reduce the amount of rulemaking to support new instrument procedure development and RNAV routes.

Bob Lamond, NBAA, commented that NBAA supports this initiative and has submitted a request for rule-making regarding the proposal.

John Collins inquired if the issue regarding VOR name retention was being discussed. Paul replied that one approach being looked at and receiving support was to allow VOR name retention for a stand-alone DME at the same location.

JoAnn commented that another thing being looked at was how Hazardous Inflight Weather Advisory Service (HIWAS) will be impacted when a VOR providing HIWAS capability is decommissioned.

Paul provided one example of how one Victor route was being impacted - Victor 3 (V3) utilizes has 19 VORs, half of which are to be decommissioned. It was decided that the airway would be totally redesigned in its entirety on a single effective date, rather than a segment at a time.

Michael Stromberg, Air Wisconsin, inquired if during this process, the FAA would look at environment efficiencies to enable the new routes to be more fuel efficient. Paul replied that during this transition, the WG will not do any environmental impact analysis. RNAV routes will be developed directly over current Victor airways to avoid the need for environmental analysis.

Valerie Watson, AJV-3B, thanked JoAnn for the excellent update on this initiative and asked that continued briefings be provided at future ACF meetings as the issue progresses.

ACTION: AJW-41 will continue to keep the ACF apprised of the status of this initiative.

Meeting 13-02

Rowena Mendez, AJM-324, provided an update on the progress made towards the transition of the NAS from a VOR-based to a satellite-based system. Rowena reviewed how the current VOR-based system operates, citing 966 FAA owned and operated VORs, most of which are very old and would require well over $1 Billion dollars to replace and modernize. The VOR Minimum Operational Network (MON) is projected to reduce the number of VORs by about 50 percent, but will continue to enable navigation of the NAS via VOR should GPS outages occur.

Rowena stated that since the last ACF briefing, the initial criteria and list of VORs to be shutdown has been drafted and has been given to the Department of Defense and RTCA. AJM-324 is awaiting feedback. She described that analysis is ongoing to evaluate maintenance work necessary for potentially remaining VORs as well as extension of the service volume of selected VORs from 40 NM to 77 NM. She mentioned that flight check validation of expanded service volumes would need to occur.

Gary Fiske, AJV-8, expressed concern that the new service volume of 77 NM could vary by altitude. Rowena stated that the base altitude is set to be established for 5,000 feet, but that discussions were still ongoing.

Lynette Jamison, AJR-B1, asked if the VORs designated to be part of the VOR MON would be restored to full operational status. Rowena responded yes, that is the intention.

Valerie Watson, AJV-3, inquired as to whether a significant proliferation of standalone DMEs is still part of the plan for the VOR MON. Rowena replied that an analysis is being done on the potential use of standalone DMEs.

Steve Van Camp, iBIZ Contract Support to AFS-420, inquired as to whether Congress was fully informed regarding the decommissioning of VORs. Rowena stated that her office is doing everything to insure that the lines of communication are kept open and that a number of inquiries from various Congressional offices regarding the decommissioning of specific VORs have been received and are being dealt with.

Discussion with the audience focused on the potential impact of the decommissioning of VORs on various aircraft operations and procedures. Proponents from airlines mentioned and discussed the potential impact on engine out procedures. Stakeholders expressed wide concern that they be provided the opportunity to comment and engage in discussions regarding the MON initiative. Rowena stated that comment periods would be provided before action takes place.

ACTION: Rowena Mendez, AJM-324, will provide an update at the next ACF.

Meeting 14-01

Rowena Mendez, AJM-324, provided an update on the progress made since the last ACF. Rowena stated that the plan includes the transition from 967 VORs to 500 VORs by a revised target date of FY2025. She stated that currently AJM-324 is focused on collaborating with the Tactical Operations Committee (TOC), working with DoD to determine which VORs they can sanction the discontinuance of and collaborating with AJV on how to integrate the VOR MON plan with the PBN program, the National Route Plan, and with Flight Procedures and Charting to insure that NAS operations are not compromised.

Gary Fiske, AJV-822, asked how the changes to the NAS infrastructure will be funded. Rowena responded that the program is currently focused on analyzing the overall technical and operational impact of the discontinuation of VOR services. Once the analytical work is completed, her office can start work on determining the associated costs.

John Belk, AJV-141, asked if there is an expectation that there will be RNAV replacements for conventional procedures as part of this program. He stated that there

is not enough funding for that to be the solution. Rowena responded that currently, her office is only looking at the future costs of the discontinuation and that current VOR discontinuations based on PBN replacement procedures are not currently part of the program.

Mike McGinnis, American Airlines, asked if the large-scale Metroplex redesigns currently underway will help with this transition. Rowena responded that yes, they will help because they rely more heavily on PBN. Gary supported this and stated that metroplex projects are not designing routes that are predicated on NAVAIDs because they are aware of this future transition.

Bob Lamond, NBAA, stated that he is hopeful the plan is to retain sufficient VORs to ensure safety. He stated that he had submitted concerns to the FAA which have not been addressed, and VORs are already beginning to be turned off.

Valerie Watson, AJV-3, commented that there needs to be a greater understanding of the future usage of standalone DME facilities. The charting offices have a lot of questions about how to publish standalone DME facility data. Is there an associated frequency? Morse code? Associated RCOs? Rowena responded that they don't know all the answers yet. Right now, DMEs are still defined by the associated VORs. Valerie stated that for now, AJV and AIM will not publish standalone DMEs and will continue to leave them in the database as a VOR/DME with a remark that the associated VOR is out of service. Valerie asked Rowena if she could collaborate with her office and AIM to help define the database & charting requirements for standalone DMEs. Rowena agreed that when she has more answers, she will communicate them.

Gary asked if standalone DMEs will be left in the same location where the DME had been previously paired with a VOR or if the standalone DME could be relocated. Rowena stated that yes, relocation is a possibility and may be an opportunity for the FAA to eliminate some of its leases and save money.

Rowena stated that the Final Investment Decision will be made in FY 2015. Then the VOR Discontinuation Plan will start to take shape. Rowena is looking for ideas on how the discontinuation process can be made more efficient. She said that her office will continue to collaborate with all the stakeholders to identify requirements and address the concerns.

ACTION: Rowena Mendez, AJM-324, will provide an update at the next ACF.

Meeting 14-02

Leo Eldridge, Tetra Tech, Contract Support to AJM-324, briefed the issue. Leo reviewed the plans for transitioning the NAS from a VOR-based NAS to an RNAV/PBN-based NAS. It is estimated that 90% of the general aviation and commercial aircraft operating within the NAS are GPS equipped. The numbers for DoD aircraft equipped with GPS were estimated to be around 60%. The need for VORs is in decline and it is still the FAA's intention to eliminate 30% to 50% of the existing VORs by 2025. The reduction will begin gradually over the first five years during which time the bulk of the procedural/airway/airspace work will assessed. Then the plan is to accelerate the process, with approximately 20 to 25 VORs decommissionings accomplished per year. Leo emphasized that there is a great deal of pre-coordination required in the decommissioning of these VORs. Many of the remaining VORs will be enhanced to supply increased service volume.

Leo stated that the coordination efforts between the FAA and DoD is ongoing. MITRE is working with the DoD to identify the VORs that will need to be retained to meet DoDs needs.

Leo emphasized that only FAA owned and operated VORs will be considered for decommissioning. There has been some discussion regarding the possibility that local authorities and airports may privatize a number of VORs that have been identified for decommissioning.

Leo discussed several challenges related to the implementation of the VOR MON. These include impacts to Instrument Flight Procedures, the implementation of the PBN National Route Structure, ongoing engineering analysis, stakeholder coordination, co-located facilities (HIWAS, RCO, ATIS, DME), and rulemaking changes. Many of these details are still unanswered.

Leo concluded by reviewing the next step for the VOR MON program. AJM-324 is still in the process of coming up with a detailed program plan. The Final Investment Decision is expected in September 2015.

ACTION: Leonixa Salcedo, AJM-324, will provide an update the next ACF.

MEETING 15-01:

Leonixa Salcedo, AJM-324, briefed the issue. Leonixa gave an overview of the VOR MON program and a status report since the last ACF. She reviewed the progress made to date on identifying VORs that may be decommissioned. She pointed out to the

audience a significant change in the number of VORs expected to be decommissioned. Previously, it had been reported that approximately 50% of all the VORs in the NAS would be decommissioned. That estimation has been readjusted to just over 33% (approximately 308).

Leonixa stated that since the last ACF, the criteria for decommissioning VORs has been developed by the FAA and MITRE. Discussions have also taken place between the FAA and the DoD, during which the military emphasized that their operational requirements within the NAS require that fewer VORs be decommissioned.

Leonixa explained that the VOR MON program will be on a 10 year timeline of two phases, with the decommissioning of approximately 308 VORs total. The first phase goes from 2016-2020 and removes 100 VORs. The second phase goes from 2021-2025 and removes the remaining 208 VORs. In the short term, Leonixa stated that a list of VORs initially selected for decommissioning will be released to the public sometime in 2015.

John Collins, GA Pilot, inquired about flight testing the 77 NM Standard Service Volume (SSV) for VORs. Dale Courtney, AJW-292, commented that the initial testing data and feedback is promising.

John Moore, Jeppesen, asked how many airports would be designated as MON Airports. Leonixa stated that the plan is for 145 MON Airports. (See New Topic: RD 15-01-295, Charting of Airports in the MON)

Rich Boll, NBAA, asked how the discontinuation of VOR services would impact Class II Navigation capabilities along the coast of the U.S. Leonixa stated that there would be some impact, but more often than not, VOR services along the coast would see an improvement with the higher SSV. Rich emphasized that NBAA remains concerned about any loss of Class II Navigation along the coast.

ACTION: Leonixa Salcedo, AJM-324, will provide an update the next ACF.

MEETING 15-02:

Leonixa Salcedo, AJM-324, briefed the issue. Leonixa gave an overview of the VOR MON (Minimum Operating Network) program and provided a status report of activity since the last ACF. She reviewed the progress made to date on identifying the specific VORs to be decommissioned and briefed that the number of VORs expected to be decommissioned has been reduced to just over 30% (approximately 308). Leonixa

emphasized that the process for decommissioning would follow the process as outlined in Joint Order 7400.2.

Approval for Phase I was received in September 2015. Phase I will run from October 2015 through to September 2020 and will result in 74 VOR decommissionings. Phase II will involve the remaining VOR decommissionings, resulting in a total of 308 by the end of 2025. The final list of all VORs to be decommissioned is still yet to be made public. It is anticipated that over the life of the program (Phase I and II), 15 VORs will be decommissioned in the Western Region, 162 in the Central Region and 131 in the Eastern Region.

Leonixa commented that work continues on evaluating the airway, procedure and airspace impact of those VORs selected for decommissioning. Leonixa emphasized that where a decommissioned VOR impacts a segment of an airway, that segment may not necessarily be replaced. A significant number of Victor and Jet routes/segments are expected to be eliminated. The total project is expected to generate changes to approximately 7700 instrument flight procedures.

John Collins, GA Pilot, expressed his concern over the current problems within the NAS regarding the disconnect between RNAV routes and Victor Airways. Leonixa stated that work is ongoing to insure those issues are addressed.

Lev Prichard, APA, expressed his concern over the potential impact of a GPS outage and the ability of the MON to handle all the aircraft airborne within the NAS during an outage. Lev asked if facilities have a contingency plan for the loss of GPS. Dale Courtney, AJW-292, responded that there is a concept of operations in place. However, there is still work ongoing to address training, awareness, new AIM guidance, and detailed plans for how the MON would operate should there be a GPS outage, either nationally or within a specific geographic area. Dale stated that the VOR MON is just one part of the FAA's contingency/back up plans.

ACTION: Leonixa Salcedo, AJM-324, will provide an update the next ACF.

MEETING 16-01:

Leonixa Salcedo, FAA/AJM-324, briefed the issue, providing an overview of the VOR MON program and a status report since the last ACF. She reviewed the goals of VOR MON Program (See Slide #2) and the VOR MON Program Timeline (See Slide #3). She stated that the Federal Register Notice (FRN) on the "Provision of Navigation Service for the Next Generation Air Transportation System (NextGen) Transition to PBN (Plan

for Establishing a VOR MON)" is due out in a few weeks. Leonixa stated that the number of VORs targeted for discontinuance remains at 308 by 2025.

Leonixa then discussed the recent VOR MON Program accomplishments, including holding two National Planning Working Group meetings to discuss the discontinuance waterfall and the role of Instrument Flight Procedures in the program implementation. Leonixa also reported that the first VOR (Orangeburg, SC) was discontinued in February 2016.

Valerie Watson, FAA/AJV-553, asked if the addition of new DMEs is still part of the plan. Leonixa stated yes and said that a different group within the FAA is handling that aspect of the program.

Rune Duke, AOPA, asked what operators can expect regarding operations and decommissioning. Dale Courtney, FAA/AJW-292, responded that when a VOR is decommissioned, a NOTAM will be issued, the NASR database will be updated and all affected airways, procedures, fixes, etc., will be amended.

Ed Phillips, FAA/AJW-B62, expressed concern over the potential lack of synchronization between changes to procedures and charts when a VOR is decommissioned. Leonixa replied that her office is working to ensure that all VOR decommissionings are carefully pre-coordinated to ensure that all aspects of the affected airspace and procedures will occur concurrently on a single chart effective date cycle.

Bob Lamond, NBAA, asked if it is possible to publish a list of everything that a specific VOR decommissioning will affect. Dale replied that a notice will be published for general awareness, but will not include a list of all the impacts.

Gary Fiske, FAA/AJV-822 asked if the resultant DMEs are going to be charted. Valerie replied yes, for the present. Per consensus from the last ACF, if the VOR portion of a VOR/DME is decommissioned, the remaining DME would still be charted. She stated that this decision could be reevaluated in the future if a proliferation of DMEs results in chart congestion.

John Collins, GA Pilot, asked, for users of 6-month VFR charts, where the notice of a decommissioning would be published. Valerie stated that all NAVAID decommissionings are published via NOTAM. Also, the Chart Bulletin in the Chart Supplement (previously the Airport Facility Directory or AFD) provides interim updates to VFR charts, so a decommissioned VOR would appear in the Bulletin for an affected VFR chart until the

chart is re-issued and reflects the change. The IFR Enroute charts are updated every 56 days, so this should not be an issue.

ACTION: Leonixa Salcedo, FAA/AJM-324, will provide an update the next ACF.